

Application No. 09/317,409
Amendment dated February 20, 2004
Reply to Office Action dated November 25, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (withdrawn) A stiffness-treated fabric comprising a plurality of fibers and a polymeric material disposed on at least some of the fibers, wherein the stiffness-treated fabric exhibits an ASTM stiffness value greater than the ASTM stiffness value of an untreated fabric.

Claim 2 (withdrawn) The stiffness-treated fabric according to claim 1 wherein the fibers of the stiffness-treated fabric and the untreated fabric are glass fibers, and wherein the ASTM stiffness value of the stiffness-treated fabric is at least 7% greater than the ASTM stiffness value of the untreated fabric.

Claim 3 (withdrawn) The stiffness-treated fabric according to claim 1 wherein the fibers of the stiffness-treated fabric and the untreated fabric are carbon fibers, and wherein the ASTM stiffness value of the stiffness-treated fabric is at least 45% greater than the ASTM stiffness value of the untreated fabric.

Claim 4 (withdrawn) The stiffness-treated fabric according to claim 1, wherein the stiffness-treated fabric exhibits an ASTM stiffness value of not less than about 3.4 lb ft.

Claim 5 (withdrawn) The stiffness-treated fabric according to claim 1, wherein the fibers are glass fibers and the ASTM stiffness value is in the range of about 3.0 lb ft to about 8.1 lb ft.

Claim 6 (withdrawn) The stiffness-treated fabric according to claim 4, wherein the fibers are carbon fibers.

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Claim 7 (withdrawn) The stiffness-treated fabric according to claim 4, wherein a portion of the polymeric material is chemically bonded to the fibers and consists essentially of advanced n-mers of precursors of the polymeric material.

Claim 8 (withdrawn) The stiffness-treated fabric according to claim 7, wherein the advanced n-mers have an average n-value of not less than 3.

Claim 9 (withdrawn) The stiffness-treated fabric according to claim 4, wherein a portion of the polymeric material is chemically bonded to the fibers and coats the fibers so as to increase the average thickness thereof when compared to the corresponding fibers of an untreated fabric.

Claim 10 (withdrawn) The stiffness-treated fabric according to claim 9, wherein the increase in the average thickness is in the range of between about 8% and about 20%.

Claim 11 (withdrawn) The stiffness-treated fabric according to claim 9, wherein a part of the portion of the fibers comprise yarns or tows having both a first capillary surface and a first non-capillary surface, and the polymeric material disposed on the first capillary surface of a first plurality of the yarns or tows has an average thickness greater than the average thickness of the polymeric material disposed on the first non-capillary surface of the yams or tows of the first plurality.

Claim 12 (withdrawn) The stiffness-treated fabric according to claim 11, wherein a subset of the yams or tows comprise filaments having both a second capillary surface and a second non-capillary surface, and the polymeric material disposed on the second capillary surface of a second plurality of the filaments has an average thickness greater than the average thickness of the polymeric material disposed on the second non-capillary surface of the filaments of the second plurality.

Claims 13 – 38 (canceled)

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Claim 39 (withdrawn) A stiffness-treated fabric raw material comprising fabric raw material, precursors of polymeric material disposed on at least some of the fabric raw material in a stiffness enhancing precursor concentration, and, optionally, polymeric material disposed on at least some of the fabric raw material.

Claim 40 (withdrawn) The stiffness-treated fabric raw material according to claim 39, wherein the fabric raw material is glass fibers and/or glass yarns and/or glass filaments and the stiffness enhancing precursor concentration is in the range of 0.25% to 1.0% by weight.

Claim 41 (withdrawn) The stiffness-treated fabric raw material according to claim 39, wherein the fabric raw material is glass fibers and/or glass yarns and/or glass filaments, optionally woven in an 8-harness weave style to form a fabric, the precursors of polymeric material have the formula of a commercially available finish known as CS 724 finish, and the stiffness enhancing precursor concentration is in the range of 0.13% to 0.17%.

Claim 42 (withdrawn) The stiffness-treated fabric raw material according to claim 39, wherein the fabric raw material is carbon fibers and/or carbon tows and/or carbon filaments and the stiffness enhancing precursor concentration is in the range of 0.10% to 0.39%.

Claim 43 (withdrawn) The stiffness-treated fabric raw material according to claim 39, wherein a portion of the precursors are chemically bonded to a subset of the at least some of the fabric raw material.

Claim 44 (withdrawn) The stiffness-treated fabric raw material according to claim 39, wherein the polymeric material is present and disposed on at least some of the fabric raw material, and wherein a first portion of the precursors and/or the polymeric material is chemically bonded to a second portion of the precursors and/or the polymeric material, and wherein derivatives are formed thereby.

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Claim 45 (withdrawn) The stiffness-treated fabric raw material according to claim 44, wherein a third portion of the derivatives and/or the polymeric material comprises advanced n-mers of precursors of the polymeric material.

Claim 46 (withdrawn) The stiffness-treated fabric raw material according to claim 45, wherein the advanced n-mers have an average n-value of not less than 3.

Claims 47 – 54 (canceled)

Claim 55 (currently amended) A prepreg of a honeycomb sandwich structure precursor including a honeycomb core, a stiffness-treated prepreg ply and a second prepreg ply, ~~in the absence of a tie down ply contacting the honeycomb core,~~ and where the stiffness-treated prepreg ply and the second prepreg ply are disposed adjacent one another, said stiffness-treated prepreg ply comprising:

a stiffness-treated fabric including a plurality of fibers and a polymeric material disposed on at least some of the fibers, where the stiffness-treated fabric exhibits an ASTM stiffness value greater than the ASTM stiffness value of an untreated fabric; and

a resin system,

the stiffness-treated prepreg ply, when disposed on the second prepreg ply comprising a resin system and a fabric selected from the group consisting of the stiffness-treated fabric and untreated fabrics, exhibiting a frictional resistance between the stiffness-treated prepreg ply and the second prepreg ply sufficiently greater than the frictional resistance between two untreated prepreg plies disposed on one another, where each of the two untreated prepreg plies comprises the resin system and an untreated fabric, so as to enhance resistance to core crush when autoclave pressures are raised to decrease void content of a honeycomb core during fabrication of a honeycomb core structure from the honeycomb core structure precursor.

Claim 56 (canceled)

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Claim 57 (previously amended) The prepreg according to claim 55, wherein the frictional resistance between the stiffness-treated prepreg ply and the second prepreg ply is between 50 pounds and 175 pounds as measured by the Boeing-Wilhelm method.

Claim 58 (previously amended) The prepreg according to claim 55, wherein the frictional resistance between the stiffness-treated prepreg ply and the second prepreg ply is between 75 pounds and 175 pounds as measured by the Boeing-Wilhelm method.

Claim 59 (previously amended) The prepreg according to claim 55, wherein the frictional resistance between the stiffness-treated prepreg ply and the second prepreg ply is between 100 pounds and 150 pounds as measured by the Boeing-Wilhelm method.

Claim 60 (withdrawn) A method of making a stiffness-treated prepreg ply comprising obtaining a stiffness-treated fabric and a resin system, and disposing the resin system on the stiffness-treated fabric.

Claim 61 (withdrawn) The method of making a stiffness-treated prepreg ply according to claim 60, wherein the stiffness-treated prepreg ply, when disposed on a second prepreg ply comprising a resin system and a fabric selected from the group consisting of stiffness-treated fabrics and untreated fabrics, exhibits a frictional resistance between the stiffness-treated prepreg ply and the second prepreg ply greater than the frictional resistance between two untreated prepreg plies disposed on one another, wherein each of the two untreated prepreg plies comprises the resin system and an untreated fabric.

Claim 62 (withdrawn) The method according to claim 61, wherein the frictional resistance between the stiffness-treated prepreg ply and the second prepreg ply is between 50 pounds and 175 pounds.

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Claim 63 (withdrawn) The method according to claim 61, wherein the frictional resistance between the stiffness-treated prepreg ply and the second prepreg ply is between 75 pounds and 175 pounds.

Claim 64 (withdrawn) The method according to claim 61, wherein the frictional resistance between the stiffness-treated prepreg ply and the second prepreg ply is between 100 pounds and 150 pounds.

Claim 65 (withdrawn) A stiffness-treated honeycomb sandwich structure precursor comprising a honeycomb core having a first surface, and a stiffness-treated prepreg ply disposed on the first surface, wherein the stiffness-treated prepreg ply comprises a resin system and a fabric selected from stiffness-treated fabrics.

Claim 66 (withdrawn) The stiffness-treated honeycomb sandwich structure precursor according to claim 65, further comprising at least one additional prepreg ply disposed on the first surface, wherein each of the additional prepreg ply(ies) comprises an independently selected resin system and a fabric independently selected from the group consisting of stiffness-treated fabrics and non-treated fabrics.

Claim 67 (withdrawn) The stiffness-treated honeycomb sandwich structure precursor according to claim 66, wherein at least one prepreg ply selected from the group consisting of the additional prepreg plies and the stiffness-treated prepreg ply extends beyond the first surface of the honeycomb core.

Claim 68 (withdrawn) A stiffness-treated honeycomb sandwich structure comprising a honeycomb core having a first surface and a second surface, a first prepreg ply disposed on and extending beyond the first surface, a second prepreg ply disposed on and extending beyond the second surface, wherein a first portion of the first prepreg ply extending beyond the first surface contacts a second portion of the second prepreg ply extending beyond the second surface to form an edgeband and, optionally, additional prepreg plies disposed on the first

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surface and/or the second surface and/or the edgeband, wherein the first prepreg ply comprises a resin system and a fabric selected from stiffness-treated fabrics, and wherein the second prepreg ply and each of the optional additional prepreg plies each comprise an independently selected resin system and a fabric independently selected from the group consisting of stiffness-treated fabrics and untreated fabrics.

Claim 69 (withdrawn) The stiffness-treated honeycomb sandwich structure according to claim 68, wherein the first prepreg ply has an elevated resin content.

Claim 70 (withdrawn) The stiffness-treated honeycomb sandwich structure according to claim 69, wherein the first prepreg ply further comprises carbon fibers and wherein the elevated resin content is greater than about 42%.

Claim 71 (withdrawn) The stiffness-treated honeycomb sandwich structure according to claim 69, wherein the first prepreg ply further comprises glass fibers and wherein the elevated resin content is greater than about 40%.

Claim 72 (withdrawn) The stiffness-treated honeycomb sandwich structure according to claim 68, wherein the stiffness-treated honeycomb sandwich structure has a first core crush value less than a second core crush value of an untreated honeycomb sandwich structure.

Claim 73 (withdrawn) The stiffness-treated honeycomb sandwich structure according to claim 72, wherein the first core crush value is in the range of 0% to 5%.

Claim 74 (withdrawn) The stiffness-treated honeycomb sandwich structure according to claim 72, wherein the first core crush value is in the range of 0% to 3%.

Claim 75 (withdrawn) The stiffness-treated honeycomb sandwich structure according to claim 72, wherein the first core crush value is in the range of 0% to 0.1 %.

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Claim 76 (withdrawn) The stiffness-treated honeycomb sandwich structure according to claim 68, wherein the honeycomb sandwich structure has less void content when compared to an untreated honeycomb sandwich structure.

Claims 77 – 86 (canceled)

Claim 87 (withdrawn) The stiffness-treated fabric raw material according to claim 39, wherein the fabric raw material is carbon fibers and/or carbon tows and/or carbon filaments and the stiffness enhancing precursor concentration is in the range of 1.08% to 1.17%.